

## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <a href="http://about.jstor.org/participate-jstor/individuals/early-journal-content">http://about.jstor.org/participate-jstor/individuals/early-journal-content</a>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

## INDEX TO VOLUME X.

ALGEBRA, ARITHMETIC (see Problems below).	
DIOPHANTINE ANALYSIS (see Problems below).	
ERRATA 56, 214, 240,	252, 279
GEOMETRY (see Problems below).	
MATHEMATICAL PAPERS.	
Cajori, F. On the Chinese Origin of the Symbol for Zero	35
Coar, H. L. The Volume of the Sphere	9-11
Collins, J. V. A General Notation for Vector Analysis	161-163
Dean, G. R. Derivation of Formula for tan 2A in Spherical Trigonometry	11 - 12
Integration as a Summation	34 - 35
Note on the Polar of a Point as to a Conic	69
Denis, A. (Miss). A Discussion of the Cases when Two Quadratic Equations	
Involving Two Variables can be Solved by the Method of Quadratics	192 - 199
Dickson, L. E. Three Algebraic Notes	219-226
A Generalization of Symmetric and Skew-Symmetric Determinants	254-256
Epsteen, S. Determination of the Group of Rationality of a Linear Differ-	
ential Equation	4-8
Analog of Sylvester's Dialytic Method of Elimination	63 - 64
Goodspeed, E. J. The Ayer Papyrus (with plate facing p. 119)	133-135
Greenwood, G. W. Some Fallacies in Text-Books on Elementary Solid	
Geometry	8-9
A Pedagogical Question in Spherical Trigonometry	
An Extension to Central Concoids of a Theorem Concerning the Seg-	
ment of a Sphere	199-200
Halsted, G. B. Our Symbol for Zero	
Himel, C. M. Converse and Opposite Propositions	
Graber, M. E. A General Theory of Projectiles	98-101
Haskell, M. W. On a Certain Rational Cubic Transformation in Space	1-3
Generalization of a Fundamental Theorem in the Geometry of the	
Triangle	30-33
Henderson, A. The Derivation of the Brianchon Configuration from Two	00 00
Spatial Point Triads	36-41
Harmonic Pairs in the Complex Plane	90-97
Kasner, E. The Group Generated by Central Symmetries, with Applica-	••••
tions to Polygons	57-63
The Apollonian Problem in Space	
Llano, Antonio. Properties of the Function $(1+a)^x$	
McKinney, T. E. Concerning Simple Continued Fractions	
Miller, G. A. An Elementary Example of Modular Systems	27-30
Appreciative Remarks on the Theory of Groups	
On the Definition of an Infinite Number	
On the Groups of the Figures of Elementary Geometry	
Moritz, R. E. On Certain Proofs of the Fundamental Theorem of Algebra.	159-161
Newcomb, Simon. An Account of Prof. Runkle's Mathematical Monthly	130-133
Peirce, A. B. Sufficient Condition that Two Linear Homogeneous Differen-	100 100
tial Equations shall have Common Integrals	65-68
Schottenfels, Ida May. Note on the Necessary Condition that Two Linear	00-00
Homogeneous Differential Equations shall have Common Integrals	257-250
Sisam, C. H. The General Euclidean Construction	97-98
Taylor, W. E. On the Product of an Alternant by a Symmetric Function	

	Tyler, H. W. Biography of John Daniel Runkle	259-262
	Williamson, A. W. Computation of Logarithms	
	Young, J. W. A. Concerning the Bibliography of Mathematics	
	Young, John Wesley. A Simple Existence-Proof for Logarithms	
NOT	Zerr, G. B. M. Certain Loci Related to a Conic	
NOT.	ES25, 85, 116-117, 149, 181, 214, 240,	252, 274
	ARITHMETIC.	
163.	Criticism on Solution of Problem. Arnold, Walker	12
165.	A borrows \$2000 payable in 100 equal payments. Finkel, Zerr	71
166.	From selling prices of two farms and gains, to find cost. Matz, Zerr	
167.	Find distance apart of poles given the speed of a train. Matz, Zerr	163
168.	Given percentages in buying and selling to find gain. Matz, Zerr	
169.	Quarterly discount on note equals 10% interest per year. Matz	263
170.	Stocks and bonds, to find investment. Lawrence, Zerr, Leonard, Greenwood	263
171.	Distance of pulling out a drawer for book to fit in. Royer, Zerr, Leonard ALGEBRA.	363
<b>154</b> .	Reciprocant of $ax^3+3bx^2y^2+ay^3+d=0$ . Matz, Finkel	41-42
<b>164</b> .	Form eliminant between $mx^3 + py^2$ and $px^2 + my^3 = 0$ . Matz, Dickson	13-14
165.	Solve $x^4-x=14$ . Elwood, Zerr	14
166.	Solve $ax+by=2zx$ , $cy+dz=2xy$ , $cz+fx=2yz$ . Baker, same, Walker	14-15
167.	Weight of m pounds falls and breaks into n pieces. Zerr, same, Griffin, Scheffer, Sanders	42-44
1 <b>6</b> 8.	n, n+2, n+6, n+8, n+12 are primes; find $n$ . Greenstreet, Finkel	71
169.	Solve $x^2 + y + z = a$ , $x + y^2 + z = b$ , $x + y + z^2 = c$ . Colaw, Walker, Zerr, Baker	72-73
170.	Solve $x^2y^2+x=a$ , $xy+y^2=b$ . Norris, Baker, Sanders, Zerr	73-74
171.	Solve $ay^2 + a = bxy + cx$ , $bx^2 + b = axy + cy$ . Schottenfels, Zerr, Baker.	103
173.	Solve $\sqrt{(a+x+y)}=z$ , $\sqrt{(b+y+z)}=x$ , $\sqrt{(c+z+y)}=y$ . Colaw, Walk-	
	er, Baker, Zerr	136
174.	(m+1)th convergent of a continued fraction. Vandiver, Zerr, Greenwood	
176.	Solve $x^2 + y^2 + z = a$ , $x + y^2 + z^2 = b$ , $x^2 + y + z^2 = c$ . Baker, Zerr	164-165
177.	Solve $m^{2x}(m^2+1)=(m^{3x}+m^x)m$ . Matz, Baker, Bassett, Sherwood	165
178.	Relation between nth powers of numbers. Greenstreet, Zerr	147
179.	Roots of algebraically solvable quintic. Dickson	201
180.	If $r/s$ makes $m/(p^2-2)$ integral then $(3r+4s)/(2r+3s)$ is integral.	
	Drummond, Zerr	
181.	Lawrence, Zerr	247
182.	$x_1/(a_i-b_1)+x_2/(a_i-b_2)++x_n/(a_i-b_n)=1$ . Lawrence, Zerr	
183.	$\exists ax^2 = \exists aax = 0, \ \exists aa^2 = 1, \text{ find condition for } x:y:z = \text{real. Greenstreet},$ Leonard	
184.	Sign of a determinant. Calderhead, Greenwood, Zerr, Leonard	
185.	Solve without radicals $ax^2+bx+c=0$ , $ay^2+by+d=0$ , $ax^2y^2+bxy+e$	
100.	=0. Dickson, MacNeish, Zerr, Saunders	264-265
100	$ax^3 + bx^2 + cx + d = 0$ , $ay^3 + by^2 + cy + e = 0$ , $ax^3y^3 + bx^2y^2 + cxy + f = 0$ ;	201 200
186.	eliminate $x$ , $y$ rationally. Dickson, MacNeish, Zerr	265
	GEOMETRY.	200
170	Shortest car that will hold given cylinder. Arnold, Philbrick	<del>44-4</del> 5
178. 187.	Remarks on No. 187. Hitt	44-45 15
404	AND SECURE AND TO SECURE AND AND ADDRESS A	TO

191. 192.	Trisect angle by means of hypocycloid. Adams, Zerr, Quinn, Graber  Maximum triangle on given base. Hume, Zerr, Short, Walker	74 75
193.	Ratio of zone to hemisphere. Beyens, Hitt, Zerr, Greenwood	103-104
194.	Economical packing of regular tetrahedrons. Baker, same	104
195.	Square circumscribing quadrilateral. Sawyer, Hitt, Scheffer, Locke	137
196.	Concurrent lines in quadrilateral circumscribing circle. Vandiver, Hitt,	
	Greenwood	138
197.	Generators of confocal hyperboloids. Walker, Zerr	
198.	Trisect angle by means of cissoid, paraboloid. Quinn	166
199.	Vertices of triangle on given line, find locus of third vertex. Anderegg, Haskell	
200.	Tangents to concentric coaxial ellipses. Greenstreet, Zerr	202
201.	Projections of conic sections on plane perpendicular to axis. Greenstreet,  Zerr	_
202.	$\sqrt{(la)+\sqrt{(m\beta)+\sqrt{(n\gamma)}}}=0$ and $l\beta\gamma+m\alpha\gamma+n\beta\alpha$ represent ellipses.	
202.	Zerr, same	202_205
203.	Two parabolae through vertices of a triangle touching circumcircle. Green-	205-208
200.	street, Zerr, Greenwood, Rathbun	905
204.	Construct triangle given angle, its bisector, and sum of including sides.	265
204.	Schuyler, Hopkins, Scheffer, Zerr	991 999
205.	Volume of parallelopiped on semi-conjugate diameters of ellipsoid. Walker,	201-202
200.	Leonard, Zerr, Greenwood	265
206.	ABCD is inscribed in circle O. $x, y, z, u$ are perpendiculars from O to the	200
200.	sides, $r$ =radius inscribed circle, $\frac{1}{2}AC.BD$ = $r\sum x$ . Greenstreet, Zerr	266
207.	Division of circle into any number of equal parts. Hart, MacNeish, Zerr,	200
201.	Sanders	266 260
		200-208
	CALCULUS.	
154.	Driving from sun at equinox, to find the path. Downer, same	15-18
155.	$y^{\text{iv}}+2y''=\sin 2x+\sin x-x$ . Matz, Hornung, Walker, Scheffer, Landis, Greenwood, Hoover	45
156.	Volume common to $x^2 + y^2 + z^2 = a^2$ and $xz^2 = (a-x)(x^2 + y^2)$ . Zerr,	
100.	Finkel	46-47
157.	Ellipse rolled on tangent ellipse. Walker, Zerr, Scheffer, Greenwood	40-47
158.	Cut hole of given size through grindstone. Walker, Hoover, Zerr, Greenwood	75–76
160.	Curve of pursuit on right cone. Finkel, Sanders	205
161.	Cylindrical oil tank, etc. Nagel, Zerr, Greenwood	
		199-140
162.	$xy'-y=x_1/(x^2+y^2)$ . Sanders, Zerr, Sherwood, Graber, Higley, Walker, Scheffer	140
163.	Curve whose abscissa varies inversely as ordinate. Matz, Zerr	167-169
164.	Evaluation of a definite integral. Zerr	83
165.	$\varphi'' + A/B. \varphi^2 - C/B = 0$ ; $A, B, C$ functions of $\varphi$ . T. C. Dickson, L. E. Dickson	269
166.	Volume by revolution of $(y^2+x^2)=a^2(x^2-y^2)$ . Haun, Zerr, Green-	
	wood 205–208,	249
167.	Evaluation of a definite integral. Zerr, same	206
168.	The x-intercept of tangent equals m times the y-intercept. Matz, Scheffer,	200
±00.	Greenwood	249
169.	Evaluation of Eulerian integral. Matz, Zerr	
17O.		
170.	Locus center of conic having four point contact with given conic. Green- street, Hoover, Greenwood, Zerr	270-271

## MECHANICS.

144. 147. 149. 150. 151. 152. 153. 154. 155. 156. 157.	Pressure perpendicular to plane yz, find displacement. Zerr, same  Suspended particle rises to horizontal position. Greenstreet, Zerr  Beads hung from horizontal line. Greenstreet, Zerr  Equivalent force systems in plane triangle. Zerr, Greenwood  Elastic ball projected along tube. Greenstreet  Ball of lead tangent to ball of rubber. Matz  Equiangular polygon suspended from vertex. Greenstreet, Zerr, Greenwood Bar in equilibrium on curve. Graber, Greenwood, Sherwood, Zerr  Beam rests on parabola. Graber, Greenwood, Sherwood  Elastic particles slide on cycloid. Greenwood, Zerr  Waterfall h feet high supports 2h feet of water. Wright, Zerr  Law of density in space, etc. Harvill, Zerr	77-78 106 24 24 141 141 169 170 170
159.	Time it takes a tree of uniform density to fall. Sanders, same	232–233
90.	Circular pond in circular field. Drane, Finkel	100_119
125.	Center of circle on extremity of major axis of ellipse. Walker, Zerr	21
126.	Average ellipse inscribed in triangle. Scheffer, Zerr	50
127.	Probable error in volume of parallelopiped. Zerr	
128.	Circles intersect on sphere. Zerr	
130.	Tetrahedron inscribed in sphere. Walker, Zerr	
131.	Volume common to intersecting spheres. Walker, Zerr	
132.	Inscribed polygon and center of circle. Zerr, Scheffer	
133.	Area common to circle and parabola. Walker, Zerr	174-175
134.	Ellipse placed on square. Zerr	175
135.	Random points of circle are diagonals of square. Walker	175-176
136.	Distance between points of rectangle. Walker, Zerr	176
137.	Value of hand at whist. Harvill, Zerr	208
138.	Area of various plane figures. Zerr, Saunders	208-209
139.	Tetrahedron inscribed in sphere. Walker, Zerr	233
140.	Triangle tangent to hypocycloid. Walker, Zerr	233
141.	Square plate on circular table. Matz, Zerr	210-211
142.	Acute Triangle. Martin	234
143.	Circle inscribed in triangle. Walker	235
144.	Four circular ponds in circular park. Matz, Zerr	236
145.	Random circle in each quadrant of given circle. Matz, Zerr	249-251
	DIOPHANTINE ANALYSIS.	
101	we law law with a form a weintercome	
101. 102.	$x^2y+xz^2=y^2z$ impossible for $x, y, z$ integers. Vandiver, King Factors of sums of squares of relative primes are sums of squares. Sawyer,	22
102.	Dickson	23
100		
103.	$x^3+ay^3=z^3$ Vandiver, Walker, Zerr	<b>5</b> 0
104.	Cube root of 3 cubes equal to square root of 2 squares. Matz, Finkel	78
105.	Odd factors of $a^{2m}+b^{2m}$ are of form $1(\text{mod }2^{m}+1)$ . Vandiver	171-172
107.	x+y+z, $x+y$ , $y+z$ , $z+x$ squares. Walker, Cross, Bell	
109.	$m!(p-1-m)!\equiv (-1)^{m-1} \pmod{p}$ . Vandiver, Dickson	
112.	Rational triangle, sides differ by unity. Walker, Zerr, Bell	
113.	Four integers, every difference is a square. Walker, Zerr	
114.	$2(a+b+1)\pm 2\sqrt{[12ab-3(a+b-c)^2]}$ is a square. Sanders, Zerr	207
115.	Sum of two squares minus third square equals square. Walker, Zerr	207

116.	$1, n, n', n''$ are divisors of $n$ , an odd positive integer, then $2^n > (n+1)$		
	(n'+1)(n''+1) Vandiver, Dickson	272	
117.	Solve $x^2-149y^2=1$ without using continued fractions. Christie	180	
118.	$x+y=a^2$ , $x^2+y^2=b^4$ ; find integral solutions. Walker, Zerr	272	
	MISCELLANEOUS.		
	$4m\pi$		
124.	$(\cos\theta + i\sin\theta)(\cos2\theta + i\sin2\theta) = \frac{4m\pi}{n(n+1)}$ . Young, Greenwood, Zerr	52	
125.	Fourier series for $x=a\cos v$ ; $y=b\sin v$ ; $r=a(1-e\cos v)$ . Matz, Zerr	52 - 53	
126.	Latitude from observations on star. Scheffer, Zerr	53-54	
128.	Diagonals of trapezium. Sanders, Zerr, Walker, Scheffer, Northrup	81–82	
129.	Altitude necessary to see sun at midnight. Scheffer, Zerr, Wright, Green-	•	
130.	Wood	82	
131.	Distance of lightning. Matz, Zerr	114	
131. 132.	Power series for $\pi^{nx}$ . Epsteen, Zerr		
133.	H <sub>m</sub> is self-conjugate in $G_{mn}$ if n is prime $<$ m. Vandiver, Zerr	55	
	$m_m$ is soft-conjugate in $a_{mn}$ if $n$ is prime $m_m$ . Vandiver, Zerr	146	
134.	$\kappa^2 s n^4 u + 2\kappa^2 s n^2 u + 1 = 0$ . Matz, Zerr	146-147	
135.	Invariants of binary quartic. Walker, Zerr	177-178	
136.	$\sin(x+\frac{1}{6}\pi)=10\sin x$ . Greenstreet, Zerr		
137. 138.	Transvectant of binary cubic. Walker, Zerr, Greenwood	212 237	
139.	Covariants of cubic from the roots. Walker		
100.	CONTRACTOR OF CAUCATION OF CAUC	201-200	
	Errata.		
Page	e 78, for No. 106, read 112.		
Page	e 115, next to last line, delete $0095M\sin^2\varphi$ .		
Page 117, last line, for Bulletin American Mathematical Society, read Science.			
Page 243, Il. 15 and 24, and p. 244, l. 7, for $(-b \pm \sqrt{D})/a$ , read $(-b \pm \sqrt{D})/2a$ .			
Page 243, lines 21, 25, 31, for 2( $ a  + 1/D$ ), read 2 $ a  + 1/D$ .			
	e 244, strike out 2 where it appears as a coefficient of $\sqrt{D}$ .		
rage	e 252, first line, read has $p$ and only $p$ solutions.		